SECTION 2.10 SURFACE-WATER RUNOFF AND EROSION CONTROL
(WAC 463-42-215)

2.10.1 INTRODUCTION

This section describes stormwater management, erosion and sediment control, and pollution prevention practices to meet state water quality standards and minimize or prevent erosion during construction and operation of the Cross Cascade Pipeline. The objectives of runoff and erosion control are to minimize impacts to surface and groundwaters and to protect the pipeline from damage.

Application for an NPDES and State Waste Discharge Baseline General Permit for Stormwater Discharges during construction of the Cross Cascade Pipeline will be made to EFSEC at least 60 days prior to beginning construction. This program requires the development and implementation of a Stormwater Pollution Prevention (SWPP) plan for construction activities. Application of pollution control measures required under the stormwater permit program will mitigate any significant offsite stormwater impacts. For operation, the only discharge permit needed will be for the Kittitas Terminal.

The SWPP for construction will consist of two main parts, an Erosion and Sediment Control Plan, and Control for Pollutants other than Sediment. The basic elements of such a plan are described below.

2.10.2 STORMWATER RUNOFF AND EROSION CONTROL DURING CONSTRUCTION

Best Management Practices (BMPs) will be implemented to minimize erosion and the transport of sediments during construction of the pipeline, pump stations, and Kittitas Terminal. BMPs will include limiting certain construction activities and installing temporary control structures such as sediment traps and filter fences. A combination of stabilization and structural erosion and sediment control methods will be used. Key aspects of the BMPs are to control both surface and subsurface slope drainage, minimize slope erosion, and minimize or prevent channel erosion at stream crossings. Effective drainage and erosion control will minimize impacts to surface and ground waters as well as protect the pipeline from damage. The most effective BMPs will be specifically identified through negotiations with state and local agencies for all construction and operations activities. These BMPs will be incorporated into both the construction specifications to be used for the original construction activities and also into the Operations, Maintenance, and Emergency Response Manual to be used during the operating life of this pipeline project.

This section is divided into two subsections. The first subsection presents general erosion and sediment control practices and the second describes specific BMPs for construction activities. Selection of specific BMPs for each site depends upon the physical characteristics and construction methods used and will be determined during the design phase. Site-specific control plans will be submitted to EFSEC prior to construction and concurrent with the submittal and review of construction permits.

Selection of specific BMPs for each site is dependent upon the physical characteristics and construction methods being used and may include the use of filter fences, straw bales, mulching, interceptor dikes and swales, sediment traps, and hydroseeding and revegetation as appropriate. Erosion and sediment control measures will be sized to handle the 25-year, 24-hour storm. Where applicable, BMPs will be determined following the Department of Ecology's Stormwater Management Manual for the Puget Sound Basin, (WDOE, 1992).

2.10.2.1 Construction of the Pipeline

Pipeline Description

A 60' wide temporary construction corridor will be acquired along the length of the pipeline route. Normally, between 30' and 60' of the corridor will be cleared of vegetation where required for pipeline installation and construction staging areas. The cleared width will be kept to a minimum. There are existing roads paralleling the majority of the route alignment, and new access and maintenance road construction will not be required. However, in some cases short road stretches may be needed to access the pipeline from nearby existing roads. New permanent road crossings at streams are not anticipated, although temporary road crossings for equipment during construction may be needed in some cases. At road crossings the width of the cleared corridor may be larger.

In general, a 60 foot construction easement is required to allow for the following:

Stock pile excavated material	15 feet
Excavated trench	5 feet
Fabricated pipe string	5 feet
Construction equipment maneuvering	15 feet
Construction vehicle traffic lanes	20 feet
Required construction easement	60 feet

Where sensitive environmental features such as wetlands or physical features of the proposed right-of-way constrict the easement widths, space provided for construction traffic, equipment maneuvering, and pipe stringing fabrication will be reduced and will result in a slowing of construction progress.

The permanent easement for operation and maintenance is 30 feet wide and is necessary to inspect and maintain the pipeline. The 30 feet will allow vehicles to access the area directly above the pipeline in the case of an emergency or for special inspection activities, and will enable small scale excavation of the pipeline where necessary for visual inspection and/or repair.

Construction of the pipeline will result in approximately 1,500 acres of cleared or disturbed land.

Following installation of the pipeline, native vegetation will be allowed to grow back in the right-of-way zone except for a strip of approximately 30' in width, that will be maintained along most of the length of the pipeline. The 30-foot strip will be kept clear of trees so that the pipeline corridor may be visually inspected from the air. Herbaceous plants will be allowed to grow on the maintained 30-foot inspection strip.

Construction progress and specific work activities are subject to the effects of terrain, topography, subsurface conditions, right-of-way width, and weather. It is not possible to predict exactly the time between initial right-of-way clearing and revegetation for any given corridor segment. The following measures will be implemented to ensure that the interval is kept to the minimum amount necessary:

- Right-of-way clearing will be restricted to no more than three (3) days worth of the average construction progress across the existing terrain.

- Opening of the ditch or trench will be restricted to no more than two (2) days worth of the average construction progress.

- Unfinished right-of-way reclamation will be restricted to one week's worth of progress. Any right-of-way which cannot be reclaimed and revegetated within one week of the pipe laying and weld examinations will be treated to prevent or minimize erosion by maintaining the erosion control facilities and, where appropriate, by covering the right-of-way with mulch.

Existing Site Conditions

Orthophotos showing the topography of the proposed pipeline route are provided in Appendix A. The topography varies from almost flat in areas east of the Cascade mountains to very steep within the mountainous regions. Vegetation is generally thick in the mountainous areas and west of the Cascades, consisting predominantly of hemlock, fir, and Douglas fir forests. East of the Cascades the vegetation thins to mostly Douglas fir and pine forests near the east Cascades, becoming sagebrush and shrubs and agricultural lands farther east.

Soils

The pipeline route crosses through several different major soil types. Appendix B shows the surficial geology in the vicinity of the pipeline route. Soils throughout the pipeline route consist mainly of loose sands, silts, and gravels. Typical soils found west of the Cascades consist mainly of gravelly sandy loam derived from glacial deposits. On steep slopes these soils are easily eroded if disturbed or left uncovered. East of the Cascades the soil is mainly a medium to coarse gravelly sand derived from alluvial deposits and fine sandy loam formed from eolian deposits. These soils are commonly shallow, with basalt bedrock

at 10 to 20" depth. These soils are also easily erodible on steep slopes where disturbed. The eolian-derived soils are also highly subject to wind erosion when disturbed. Outcrops of bedrock occur in several areas along the route. Most surface exposures of rock are located within the mountainous areas of the Cascades and at the crossing of the Columbia River. See also Section 3.1.2 Topography.

Critical Areas

Areas with high potential for erosion problems include areas with steep slopes composed of loose, easily erodible sediments. Investigations have identified high risk erosion areas along the pipeline corridor (Appendix B: Soil Types and Erosion Hazard Maps). Other critical areas include locations where the pipeline will be close to or cross streams that contain critical fish spawning habitat, anadromous fish runs, priority fish species, priority wetland habitat, or sensitive species habitat (see Section 3.4 Plants and Animals). The most critical slopes are the steep approaches to stream crossings where the pipeline trench is parallel to the slope angle, bank erosion can destabilize slopes, drainage is concentrated and sediments can directly enter a receiving water. Stringent erosion and sediment control measures, aggressive slope stabilization measures and frequent monitoring will be implemented during and after construction in the vicinity of these critical areas.

The proposed project is consistent with the Northwest Forest Plan and the Aquatic Conservation Strategy. The Strategy seeks to restore and maintain the ecological health of watershed lands and aquatic ecosystems, to protect salmon and steelhead habitat on federal lands. It follows recent trends in raising the level of attention to the watershed and landscape scales (as opposed to project- and species-specific planning).

Standards and guidelines have been developed to implement Aquatic Conservation Strategy objectives, which focus on the distribution, diversity, and complexity of watershed features; connectivity; physical integrity; water quality; the sediment regime; in-stream flows; flood inundation and water table elevation; plant species composition and structural diversity; and habitat maintenance and restoration. The Strategy states that, "in order to make the finding that a project or management action meets or does not prevent attainment of objectives, analysis must describe existing conditions and the range of natural variation, and address how the proposed action maintains the existing condition or moves it within the range of natural variability."

For the Cross Cascade Pipeline, work conducted to prepare the Application is sufficient to make the required determination. Comparing the mitigated impact of the pipeline on the natural environment with the specific standards and guidelines promulgated to implement the Strategy, no conflicts have been identified that would result in a finding that the project will not meet or prevent attainment of the Aquatic Conservation Strategy's objectives. For example, based on prescriptions in existing watershed analyses regarding reforestation density and riparian management, it appears that the Cross Cascade Pipeline can be routed across streams to meet Aquatic Conservation Strategy goals without conflict. The prescribed density of large conifer trees will not be compromised by the 30-foot pipeline corridor through the riparian

zone. The construction methods, erosion control, and revegetation committed to will maintain water quality and the other functions of those zones. None of the actions required to construct and maintain the pipeline as proposed would prevent the attainment of the Aquatic Conservation Strategy objectives and goals.

2.10.2.2 General Erosion and Sediment Control Methods

BMPs will be used for construction of staging areas and the pipeline. Specific BMPs for each site depend upon the physical characteristics of each site and will be determined during field observations and geotechnical surveys prior to construction. BMPs will include the use of filter fences, straw bales, interceptor dikes and swales, sediment traps, mulching, hydroseeding, and revegetation as appropriate. In some cases, matting or netting may be required on steep slopes and stream banks. Erosion and sediment control measures will be sized to handle the 25-year, 24-hour storm. Erosion and sediment control BMPs from the Stormwater Management Manual for the Puget Sound Basin (SWMM), (WDOE, 1992), will be implemented wherever possible for construction of the pipeline.

Table 2.10-1 indicates four characteristic geomorphologic and hydrologic regimes along the pipeline route which require consideration of unique drainage and erosion control issues. The four regimes are defined by topographic conditions, soil and depositional conditions, hydrologic/flooding conditions (as defined by the U.S. Geological Survey in USGS 1975) and climatic conditions. In general, rainfall and topographic relief increases from Puget Sound to the crest of the Cascade Mountains, forming two definable regions, the Puget Sound lowlands and the western Cascades. The eastern Cascades exhibit steep topographic relief similar to the western Cascades but with reduced precipitation, and the foothills and plains east of the Cascades exhibits low rainfall and desert like conditions.

TABLE 2.10-1
CHARACTERISTIC HYDROLOGIC AND GEOMORPHIC REGIMES AND UNIQUE BMP ISSUES ASSOCIATED WITH EACH REGIME

Regime and Route Segment	General Description of Regime	Unique BMP Issues
Puget Sound Lowlands: Thrasher Pump Station to Snoqualmie River Crossing USGS Flood Zone III (USGS 1975)	Shallow water table in valleys. Wet, deep, erodible soils. Downcutting stream channels in upland areas, deeply incised with unstable banks. Broad floodplains in larger stream valleys.	Very steep approach slopes to streams in upland areas, with potentially unstable banks require close monitoring and drainage control during construction, with aggressive restabilization measures on approaches after each construction season. Seasonal construction phasing is critical to avoid wet conditions, high flows, and salmon spawning. Construction window from late June through early September. Downcutting streams and bank instability must be considered for stream crossing burial depths and wetlands.
Western Cascade Mountains: Snoqualmie River Crossing to Snoqualmie Pass USGS Flood Zone II	Wet, thin soils overlying bedrock, except in alluvial valleys. Steep slopes and approaches to streams are landslide-prone. Seasonal wetness and seeps extremely critical to slope stability. Snow-dominated peak flood events.	Seasonal phasing is critical to maintaining slope stability, and to avoiding both severe slope drainage problems and bank destabilization during pipeline and stream crossing construction. Aggressive slope drainage control measures during construction and operation are important. Rapid slope restabilization after construction is also critical. Seasonal construction window is short, extending from mid-July to mid-September.
Eastern Cascades and Foothills: Snoqualmie Pass through Upper Yakima Valley to the Columbia River Crossing USGS Flood Zone VI	Upper mountainous portions of this section near Snoqualmie Pass (above the Yakima River crossing) have steep slopes subject to landslides, particularly during spring and early summer snow melt conditions, or during summer storm events. Soils are typically thin and erodible, with downcutting channels and incised gullies and canyons in the lower foothills.	In upper mountain areas, slope drainage control is critical to maintaining slope stability during construction and operation. At stream crossings in lower foothills within incised canyons, must consider downcutting and bank instability for burial depth and crossing method. Seasonal construction window is from late summer to November.
Columbia Plateau: Columbia River crossing to Pasco USGS Flood Zones X and XII	Dry, erodible soils of variable thickness overlying basalt bedrock. Flat to hilly terrain in the Saddle Mountains. Large landslide area exists in the northwestern slope of the Saddle Mountains, including the Corfu landslide site. Steep escarpments and canyons occur in some drainages in the basalt. These canyons formed from ancient flood events and are not significantly downcutting at present. The region experiences very dry conditions in summer, fall, and winter; however, irrigation maintains high water levels in canals during much of the summer.	Seasonal construction window occurs from July through December. However, large summer thunderstorm events initiate temporary high flows, and construction will cease during these events. In addition, channel and bank restoration at irrigation canals is important in order to prevent disruption or loss of valuable irrigation water due to leakage and channel erosion. Additionally, the Corfu landslide area will be avoided.

The conditions and hydrologic concerns described in Table 2.10-1 will direct the appropriate selection and use of BMPs during construction and operation for each geomorphic region. Unique considerations will include modifications or additions/deletions to the standard BMPs described in SWMM (WDOE 1992), as directed and implemented by the construction supervisor with EFSEC oversight and coordination. Table 2.10-2 identifies specific BMP objectives appropriate to the various aspects of the project. The objectives will be matched with the concerns associated with each region and specific to each location along the pipeline route.

TABLE 2.10-2
RUNOFF AND DRAINAGE ISSUES, BMP OBJECTIVES
DURING CONSTRUCTION AND OPERATION PHASES

Construction	Issues	BMP Objectives
Pipeline	Interruption of cross-slope drainage on steep approaches to stream crossings. Increased runoff and surface erosion on disturbed ground, particularly on steep slopes and approaches to streams. Potential slope destabilization from concentration of runoff in excavated areas where drainage is routed. Trench dewatering in shallow groundwater areas.	Phase construction to avoid wet periods and storms. Provide adequate cross-drainage. Implement erosion control measures on slopes to slow runoff velocities and trap sediments. Route drainage to stable areas at base of slopes or onto well-drained soils. Route dewatering discharge to level, stable areas for re-infiltration. (Dewatering will likely not be an issue on steep slopes due to lack of groundwater).
Staging Areas	Surface erosion and drainage. Potential for spills from fuel storage.	Locate staging areas on level ground and provide secondary containment in fuel storage areas. Recommend using borrow pits with in-sloping entrance for staging areas.
Stream Crossings	Destruction of stream and riparian habitat. Potential streambank and streambed destabilization with subsequent erosion sediment transport downstream.	Phase construction activities to coincide with lowest flows and when fisheries concerns are at a minimum. Apply the most appropriate and cost-effective stream crossing construction technique, selected according to stream sensitivity (see Appendix A). Reconstruct and stabilize disturbed streambanks and streambeds. Protect streams from surface erosion generated on approach slopes, using sediment trapping techniques and adequate drainage control.
Operation		
Pipeline	Disruption of drainage on slopes, affecting slope stability. Trench acting as a preferential pathway for shallow groundwater. Soil and groundwater pollution from potential leaks and spills. Pipeline corrosion potential in shallow groundwater areas.	Provide adequate drainage in trench alignments on contour by matching trench backfill permeability with native soil permeability. On trench alignment parallel to slopes, provide barriers at stream crossings to minimize the impact of trench acting as preferential pathway for drainage and potential leaks. Provide appropriate monitoring for potential leaks and for corrosion (see Groundwater Section.)
Stream Crossings	Potential for pipe exposure resulting from channel scour and erosion with additional bank destabilization. Potential for oil leaks and spills entering streams from pipeline.	Monitor crossings frequently, especially in downcutting streams. Provide contingency crossing plans in event that pipe is exposed or damaged by scour and erosion. Provide leak detection monitoring for the pipeline.

Construction activities will be controlled to help limit erosion. Clearing, excavation, and grading will be limited to those areas absolutely necessary for installation of the pipeline. Areas outside the construction limits will be clearly marked in the field and equipment will not be allowed to enter these areas or to disturb existing vegetation. Excavation and grading will be completed during the dry season to the maximum

extent possible. Rock mats will be emplaced at all areas where equipment exits the construction site onto paved roads. All erosion and sediment control BMPs will be regularly inspected, well maintained, and cleared of accumulated debris and sediment whenever needed.

Surface runoff will be directed around and away from disturbed areas. Check and/or diversion structures will be constructed at the top and at the base of steep slopes, where necessary, to direct runoff. Surface runoff from disturbed areas will be dissipated or directed through check dams, vegetated strips, or sediment traps prior to discharge.

Subsurface excavated materials will be reused as much as possible. Excess materials will be disposed of by spreading over the trench as much as possible, or will be placed and stabilized in existing borrow pits along the route alignment. These materials will be placed where they will not easily erode, and will be trucked to the borrow pits if they cannot be placed on relatively level (less than 4:1 slope) ground in the vicinity of the pipeline. Disposal areas will be revegetated or hydroseeded as soon as possible.

The following erosion and sediment control BMPs will be utilized as necessary for construction of the distribution/storage facility, pump stations, and pipeline. The implementation of the BMPs will be planned in advance of construction. Construction specifications will include general plans, schedule, selection of BMPs for typical conditions along the alignment and BMP performance criteria. However, in field implementation will be the responsibility of the site construction manager with oversight from the responsible EFSEC representative. The construction manager will also be responsible BMP performance and monitoring, with EFSEC oversight. Other BMPs may also be used, depending on the site characteristics and construction activities to be accomplished.

Construction Phasing and Sequencing

The most important and effective BMP that will be implemented during construction may often be seasonal construction phasing. Avoiding the wettest periods for construction, and insuring that slope and channel stabilization measures are implemented immediately after construction will reduce potential erosion and downstream water quality impacts significantly. When feasible, construction will coincide with the periods of lowest rainfall and streamflow. The seasonal window of opportunity for construction is listed on Table 2.10-1 for each hydrologic/geomorphologic regime along the alignment; however, the construction period may also be defined within limits based on fishery, wildlife and irrigation concerns.

Construction schedule and sequencing is also a critical component of effective drainage and erosion control. The construction schedule will be developed in detail as part of the overall pipeline construction specifications by stationing. The schedule will be designed to initiate and complete all ground disturbing and site stabilization activities within a construction window (see Table 2.10-1 and Fisheries Section) which avoids periods of high rainfall and periods of fishery, wildlife and water use (i.e. irrigation periods)

sensitivity. The construction sequence is also important, and focuses on having drainage and erosion control measures in place as soon as possible to avoid periods of time where uncontrolled runoff can cause higher environmental risks. During pipeline trenching the following construction sequence will be followed:

- Clearing;
- Installation of drainage and erosion control measures including placement of ditches, dikes and berms, filter fences, sediment traps etc. Drainage control structures will direct runoff to stable locations on either side of the pipeline right of way, where the runoff can be dissipated and infiltrated. Straw bales will be used with discretion, and can be moved to needed locations during the construction in response to runoff conditions;
- Trenching and pipeline installation;
- Backfill and slope stabilization including revegetation, construction of slope berms etc.

On the approaches to stream crossings, drainage control structures will be located at the top of the slope/bank and at the base of the slope/bank. Runoff will be routed to stable slopes on either side of the right of way, or will be routed via temporary conveyance structures to the base of the approach slope where it can infiltrate into the stream bank and eventually seep back to the channel. Detailed discussion of construction at stream crossings is described in section 2.10.2.5 "Construction at Water Crossings".

Filter Fences and Straw Bales

Filter fences, or a combination of filter fences and straw bales, will be installed to prevent or minimize sediment from steep slopes and disturbed areas leaving the construction site or entering waters of the state. These sediment retention structures will be used in areas with moderate to high erosion potential (based on soil type and slope). See Figure 2.10-1.

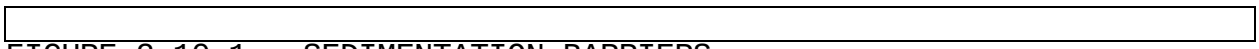

FIGURE 2-10.1 - SEDIMENTATION BARRIERS

Filter fences are useful to intercept and retain small amounts of sediment under sheet flow conditions and will be placed along the borders of water bodies wherever disturbance or construction occurs in proximity to the water body. Filter fences will be a minimum of 10' from the ordinary high water mark of wetlands, streams, and rivers and the natural vegetation will be retained within the 10' buffer zone. Filter fences will be used in areas subject to sheet erosion where the drainage area is one acre or less or for larger areas in combination with a sediment basin. Filter fences will be used on slopes no greater than 1:1. The maximum flow path to each fence will be about 100'. No concentrated flows greater than 0.5 cfs will be directed toward any fence. The proposed pipeline will be traversing many different soil types and caution will be used to ensure that the appropriate filter fabric (pore size) is used for the correct soil conditions. Filter fences will be trenched upslope from the barrier and supported by support posts spaced a maximum of 6' apart.

It is anticipated that straw bales will be one of the most commonly used sediment control methods during construction of the pipeline route. Straw bales will be used in areas subject to sheet and rill erosion and where the drainage area is no greater than 1/4 acre per 100' of barrier length and the maximum slope behind the barrier is 50 percent (2:1). In most cases, bales will be place in single rows along contours with the ends tightly abutting one another. To ensure that there is no underflow the bale barriers will be entrenched. Whenever possible, the back side of the bale will be a nondisturbed natural area. If the area behind the barrier has been disturbed or is naturally subject to erosion, the barrier will be back filled. All bales will be tied and staked. OPL will ensure that hay bales are not used in place of straw bales, because of the potential from hay to introduce non-native grasses to the area.

Methods for constructing filter fences and straw bale barriers are presented in more detail in the Stormwater Management Manual, referenced above. The barriers will be maintained throughout the construction period and inspected daily during prolonged rainfall or immediately after each rainfall.

Sediment Traps

Sediment traps are small temporary ponding areas used to detain stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment entering streams and rivers. Sizing criteria for the traps include inflow and sediment load, but traps will generally be used for small drainage areas less than 3 acres. Because sediment traps filter out all but the finest sediments, filter fences may be used at the outfall of the trap to retain silt and clay-size sediments.

Sediment traps will be located to intercept runoff from disturbed areas and will be located away from natural stream channels. A sufficient number of traps will be constructed to intercept runoff from the disturbed area and will have sufficient capacity for potential storm events and accumulated sediment.

Sediment traps will be designed for the specific disturbed area, for bare soil conditions, and, typically, for a 75 percent removal efficiency of sediment runoff. The sediment traps will be formed by earth embankments that are protected against erosion using rock or erosion control netting as further detailed in Ecology's Stormwater Management Manual. Sediment traps will consist of check dams located within an enlarged section of the interception ditch on stable ground, i.e., ground not subject to oversaturation and sliding. Stable ground will be identified as those areas with well drained soils and/or where vegetation remains in place to provide sufficient root strength to prevent sliding. In areas where stable ground is not available, several small check dams will be used to prevent buildup of excess water. Traps will have both a low-flow outlet and an emergency overflow. Rock will be placed at the outlet and overflow to prevent erosion where the water enters the downstream drainage way. Outlet pipe, if needed, will be sized to pass runoff from a 25-year, 24-hour storm. The traps will not be constructed on fill material. See Figure 2.10-2 for a typical site using sediment traps to control sedimentation.

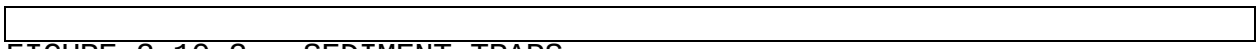

FIGURE 2-10.2 - SEDIMENT TRAPS

Check Structures and Slope Ditches

There are several methods to control erosion on steep slopes. The first is to prevent water from running from the construction corridor down the slope to be trenched. The use of check structures such as dikes and swales will reduce runoff velocity on disturbed slopes and divert surface runoff around and away from steep slopes. Typical designs are presented in Ecology's Stormwater Management Manual (WDOE, 1992). Dikes and swales may be constructed at the base, top, or horizontally across slopes as needed and the runoff will be diverted to a sediment trap or for larger areas a sediment basin.

Where appropriate, rock check dams will be placed in temporary or permanent ditches/swales to induce sedimentation and reduce runoff velocity in these areas. Typically, rock check dams are placed every 50 to 100' within temporary or permanent drainage ditch/swales to slow flows.

Along steep slopes, erosion can be reduced through the construction of stair steps, grooving, or gradient terraces. These methods provide some erosion protection on bare soils, increase infiltration, and aid in the establishment of vegetative cover after construction. Slopes that are greater than 3:1 will be considered for this type of erosion control. These constructed methods of erosion control may be used in conjunction with other types of sedimentation control, such as straw bales, filter fences, or sediment traps.

It may also be necessary to use plastic sheeting or some type of fiber matting on very steep slopes to minimize erosion from occurring during heavy rainfall events. These methods reduce the impact from rainfall directly on the slope. These methods will be used in conjunction with other water retention and control methods, particularly plastic sheeting, which does not allow for any infiltration of water and results in larger volumes than would occur using other methods of erosion control.

Temporary Water Conveyance Structures

Temporary water conveyance structures may be used to divert natural waterways or storm drainages during construction. Structures will be designed to emulate the natural drainage to the extent feasible and will be sized to handle the 25-year, 24-hour storm. Debris barriers will be provided at the entrance to the structure. The receiving channel of the outlet will be protected from erosion by rock lining or similar methods. BMPs will be employed to prevent erosion and sediment transport during the removal of the structure and re-establishment of the original waterway or drainage channel course.

Mulching and Revegetation

Mulching and prompt revegetation will be used to minimize erosion of exposed soils. Vegetation will be re-established as soon as possible on all disturbed ground, including access roads and trench backfill. Native

vegetation will be planted in the same growing season as construction or immediately following construction, or if not possible, the disturbed areas will be covered with straw, matting, or some other erosion control material in the interim. At most locations, broadcast seeding and the replacement of saplings will be the predominant method of revegetation. Seed will be planted by either the hydroseed method or by covering with a mulch. A grass and forb mixture recommended by the U.S. Natural Resource Conservation Service and the Washington Department of Fish and Wildlife will be used to reseed slopes, with fertilizer applied where suitable. Bioengineering methods will also be used to stabilize steep banks where appropriate. At locations where the terrain or other conditions would combine to cause a high risk of erosion, the revegetation method will be to Adrill plant@ grasses or hydroseed over the steep erodible slopes and then cover with straw or netting.

Permanent Stabilization

Material that was pushed aside to make temporary level working areas will be replaced onto the right-of-way. The original contours of the land will be restored as closely as possible. Equipment access crossings will be removed. After the contours have been re-established, the topsoil that had been previously segregated will be redistributed across the surface of the right-of-way. Water bars will be graded horizontally across the slopes to help prevent gullying and rill erosion. Areas compacted by heavy construction equipment will be chiseled and disc-plowed to loosen compacted soil.

Following final grading, disturbed areas along the right-of-way will be stabilized by replanting with native, non-invasive plant species or they will be returned to a condition agreed to by the landowner (e.g., returned to a condition suitable for planting crops). Forested and shrub areas that have been impacted by construction but are not to be maintained as part of the right-of-way access road will be replanted with suitable native tree and shrub species. Stumps and downed logs will also be placed in disturbed areas outside of floodplain areas. Within floodplains, ground stabilization will include only rooted or anchored features, used to slow runoff velocity and erosion until vegetation is re-established. Steep slopes may require the use of matting or netting to help stabilize the soil while new vegetation is established.

Disturbed stream banks will be stabilized using native vegetation and bioengineering and engineering methods as required depending on site conditions. Wetlands will be stabilized by replacing the original subsoil and topsoil, replacing vegetation, and returning the topography and hydrologic characteristics of the wetland as closely as possible to their original form. Disturbed buffers of wetlands will be stabilized by replanting appropriate native vegetation.

2.10.2.3 Minimum BMPs for Construction Activities

Construction activities will be controlled to help limit erosion. Clearing, excavation, and grading will be limited to those areas absolutely necessary for installation of the pipeline. Areas outside the construction

limits will be clearly marked in the field and equipment will not be allowed to enter the areas or to disturb existing vegetation. Excavation and grading will be completed during the dry season to the maximum extent possible. Prompt grading, mulching, and revegetation will help limit erosion. Spray water will be used as needed to help control wind-blowing of fine materials. The amount of spray water will be controlled such that run-off does not occur.

Surface runoff will be directed around and away from disturbed areas and conveyed in temporary channels. Runoff from disturbed areas will be directed through check dams or sediment traps prior to discharge. If necessary, check structures will be constructed at the base of steep slopes to direct runoff around the disturbed area. Trench dewatering devices will discharge into a sediment trap or sediment pond.

Stockpiles of excavated materials or erodible raw materials such as soil, sand, and backfill materials will be covered, if necessary, and berms will be placed to prevent stormwater from entering stockpiles. If piles are so large that they cannot be feasibly covered and contained, erosion control practices will be implemented at the perimeter of site to prevent offsite movement.

Subsurface excavated materials will be reused as much as possible. Excess materials will be disposed of by spreading over the trench if possible. These materials will be placed where they will not easily erode, and will not be placed at slopes greater than 4:1. Disposal areas will be revegetated or hydroseeded. If suitable slopes are not available onsite for spoils disposal, the excess material will be trucked offsite to a suitable location.

2.10.2.4 Construction in Sensitive Areas (Streams, Wetlands, and Wildlife Habitat)

Additional measures will be required for pipeline construction near sensitive areas which include streams, wetlands, and wildlife habitat. Care will be taken in working around streams and wetlands to prevent unnecessary damage to or removal of shoreline vegetation. Staging areas will be placed at least 50' away from stream banks and wetlands whenever possible. In addition, all streams, ponds, and wetlands adjacent to disturbed areas will be protected by the use of filter fences, straw bales, or other BMPs to prevent sediment from entering the water body.

During stream crossings, a number of measures may be used to decrease damage to waterways. In streams large enough and with enough flow, temporary in-stream settling ponds will be used to catch sediments generated by construction; these sediments will be removed as soon as construction is completed in that area. For smaller streams or where appropriate, stream waters could be bypassed through construction areas by the use of flume pipes, pumps, or coffer dams. Stream waters may also be bypassed using directional drilling techniques, (see Section 2.14 Construction Methodology for more information on stream crossing methods). Stream crossing methodologies have been identified and are listed in Tables 3.3-6 and 3.4-8.

Streams and wetland areas will be restored and banks will be stabilized immediately following construction activities in the vicinity. Native plants, matting, netting, bioengineering, and other BMPs will be used to stabilize banks. Instream deflectors and anchored logs may be used in high-velocity streams to protect vulnerable banks and allow for sedimentation and reestablishment of vegetation. Riprap revetment may also be used, if necessary, to help stabilize slopes in areas of high-velocity stream flows. The use of riprap will, however, be minimized. Monitoring of BMP performance in critical areas, particularly at sensitive stream crossings and stream approach slopes will be conducted and documented on a routine basis, prior to and after major storms during construction and operation. Sensitive stream crossings will be determined based on a sensitivity ranking system (Section 3.3 and Tables 3.3-6, 3.4-9), discussions with EFSEC, Ecology, Fish and Wildlife and field observation. Based on the performance monitoring, additional BMPs or other improvements will be implemented to insure minimization of impacts.

2.10.2.5 Construction at Water Crossings

Several methods will be used for water crossings, including open-cut channels, directional drilling, and bridge crossings. The standard BMPs for pipeline construction in trenches, construction near sensitive areas, and construction staging areas will be applicable to each of these water crossing methods. In addition, concerns and objectives specific to stream crossings are described in Table 2.10-2.

Construction at stream crossings will be according to the selected stream crossing method (wet trench, dry trench, drilling or bridge) and specific mitigation concerns associated with the level of disturbance and stream sensitivity. The general construction sequence for trenched stream crossings include the following basic steps:

- Construct flow by-pass structure (for dry trenching) to create a relatively dry stream bed or a backwater condition with flow velocity less than 0.1 meter per second (velocity low enough to prevent erosion). Flow by-pass structure will cross the full width of channel (including side channels) in one span or in stages. In the case of wide channels requiring staged by-pass structures that create reduced backwater flows (rather than dry bed conditions), the by-pass process can include more than one construction sequence;
- Once the flow is controlled (in the case of wet trenching, step one above is not needed), route flow into the by-pass and trench across the entire channel width to the appropriate depth below maximum scour and install pipeline;
- Backfill the trench with native bed material, and stabilize the bed and bank with armoring matched to baseline flow conditions;
- Re-introduce flow and monitor performance.

The construction sequence for drilled and bridged crossings entails less disturbance in the channel, and

includes a number of unique considerations associated with the method and equipment used to construct the crossings. In general, however, the stream channel disturbance is greatly reduced compared to trenching and does not require the same level of flow and erosion control. Considerations include preventing runoff and contaminants from the staging areas on either side of the crossing from entering the stream. This will require construction of secondary containment structures (i.e. berms and filter fences) along with runoff dispersion and sediment traps to prevent any runoff generated in the staging areas from reaching the stream.

Additionally, equipment will not be run into the stream channels such that stream bank and bed integrity is maintained. If a temporary stream crossing structure for equipment is needed, an appropriate structure will be designed and constructed prior to pipeline construction (see Section 2.14).

The following describes specific methods and associated BMPs which will be employed to construct stream crossings. At stream crossings with the greatest environmental sensitivity (i.e. the most sensitive to impacts), detailed stream crossing design plans and specifications will be developed as part of the design phase and will include at a minimum site specific scour depth and width estimates, site specific sediment and drainage control plans, site specific stream bank and bed restoration plans, site specific stabilization plans, site specific stream crossing construction plans with phasing and sequencing, and site specific monitoring plans. Environmental impact sensitivity ratings have been developed for all stream crossings traversed by the proposed pipeline route. The sensitivity ratings, the rating criteria and interpretation of the ratings are presented in Section 3.4.4 and Tables 3.3-6 and 3.4-9.

Open-cut Channels

Two basic methods are used in open-cut construction, wet trenching and dry trenching. Wet trenching is employed in streams with low velocity (generally less than 0.1 m/s) and/or there are no water quality and aquatic habitat concerns immediately downstream. A field assessment will be made by the construction manager (with oversight by EFSEC) at each crossing to determine low sensitivity and/or low velocity at the time of construction (preliminary sensitivity ratings have been developed based on survey information which can be used as an initial guideline, see Tables 3.3-6 and 3.4-9). Once the determination is made, wet trenching will proceed, or the alternate dry trenching method will be employed.

Dry trenching uses flow control methods to route flow past the open cut. Flow is re-introduced to the channel after the pipeline is backfilled and the bed and banks are stabilized. Dry trenching can dam and divert flow completely out of the channel, for example into a dry adjacent channel or through a temporary pipe or sluice, or can dam a part of the channel, concentrating flow in other parts of the channel and creating a backwater behind the temporary dam which can be trenched but which will not allow velocities high enough to cause erosion (less than 0.1 m/s). This latter approach, will complete the trenching in two stages, one from each bank. Method descriptions are shown in Section 2.14.

The trench crossing the stream will be excavated using trackhoes operating from the stream banks. The pipeline crossing and alignment will be as nearly perpendicular to the stream as possible. Alterations to and disturbances of the stream bed, stream bank, and bank vegetation will be limited to the amount necessary to construct the project. The pipeline will be installed at a sufficient depth so that subsequent disturbance of the streambed is avoided. The depth will be below the maximum potential scour depth in the channel.

Stream waters will be diverted past the construction areas using temporary conveyance structures such as flume pipes, pumps, or coffer dams. The stream diversion will be designed and operated such that it does not cause erosion and scour of the stream channel and will be screened to preclude fish entry. Excavating will be conducted to avoid cave-ins and sloughing of the trench sides and river banks. The original gradient of the stream will be maintained following backfill and no spoils banks or other objects will be left in the channel. All areas disturbed by the construction will be stabilized by mulching, reseeding, or rip-rap placement, and excess spoils will be disposed of such that they do not re-enter the stream.

Directional Drilling

Directional drilling will be conducted at the Columbia River crossing. Horizontal directional drilling minimizes disturbance to the watercourse bed and reduces environmental concerns in sensitive areas such as rivers, streambeds, and wetlands.

The setback distance on both banks of the Columbia River exceed the recommended 100' for potential flooding and erosion potential. Concentrated flows of water will be diverted from the drilling location by using sandbags, or other check dams. Temporary sediment traps may be used to catch sediments generated during the drilling. Soil cuttings and accumulated sediment will be disposed of by appropriate methods and exposed soils will be stabilized at the end of the job using mulch or other erosion control methods.

Typical drilling fluid will be a bentonite water mix (e.g., 10 to 12 gallons/pound) and may contain additives as appropriate. Oil based fluids will not be used. All drilling fluids will be contained in basins which will be designed to hold all of the circulating fluids and which will be excavated on one side of the crossing. In no situation will fluids be allowed to discharge from the basins or the surface of the drill site to any stream.

Although hydraulic fracturing is possible at any directional drilling operation, such fracturing is not likely to occur with this project. In order for hydraulic fracturing to occur, the pressure of the drilling fluid would have to exceed the soil pressure in the borehole. Using the angle or repose method of calculating soil pressure for the suggested drillpath at the Columbia River, it is estimated that the drilling fluid pressure would have to exceed 1500 psi to cause a hydraulic fracture. Typically, however, drilling fluid pressures

are kept far below this value.

For more information, consult the Geotechnical Investigation to Assess Horizontal Directional Drilling at the Columbia River Crossing (Dames & Moore, 1997).

Bridge Crossings

BMPs similar to those for road crossings and entrances will be employed to minimize the amount of sediment accumulation on the bridge as the pipe is suspended. Any sediment deposited on the bridge will be removed daily and will not be washed directly into the stream.

2.10.2.6 Road Crossings or Entrances

Rock mats will be placed at entrances/exits to each site to minimize the amount of sediment accumulation on public roadways. Any sediment deposited on paved roads will be removed daily. Sediment will not be washed into existing catch basins.

2.10.2.7 Construction on Steep Slopes

Slopes greatly increase the potential for erosion due to higher runoff velocities and less infiltration. Check structures such as dikes and swales will be used to reduce runoff velocity on disturbed slopes and to divert surface runoff around and away from steep slopes. Dikes and swales may be constructed at the base, top, or horizontally across slopes as needed and the runoff will be diverted to a sediment trap. Filter fences, or a combination of filter fences and straw bales, may be installed to prevent sediment eroded from steep slopes and disturbed areas from entering a water body or leaving the construction site. These sediment retention structures will be used in areas with moderate to high erosion potential (based on soil type and slope). In addition, matting or netting may be used on steep slopes to prevent erosion. Mulching and prompt revegetation will be used to minimize erosion of exposed soils. Temporary diversions will remain in place until the slope is re-stabilized.

2.10.2.8 Pump Stations, Block Valve Locations, and Construction Yards

Facility Description

Five pump stations will be constructed along the pipeline, in addition to the pump station to be located at the distribution facility. Locations of the pump stations are shown in Appendix A. A pump station will be built at Thrasher, North Bend, Stampede, Beverly-Burke, and Othello. Each station will be constructed on approximately 2 acres. A control building will be constructed on each site. A site plan for each facility is shown in Section 2.3 Construction on Site.

Existing Site Conditions

The Thrasher site is dominated by grasses and forbs with only a few trees present at the site. It has moderate slopes with some areas exceeding a 25 percent slope. The site will have to be partially cleared and graded for construction of the pump station.

The other sites at North Bend, Stampede, Beverly-Burke, and Othello all are located in open, relatively flat areas that will require no removal of trees. The vegetation at these site ranges from grasses and forbs to agricultural crops.

Erosion and Sediment Control BMPs

Construction of the pump stations will utilize the same BMPs described above for construction for of pipeline and distribution facility. Selection of BMPs will depend on the conditions at the site when construction occurs. Specific BMPs for problem areas will be determined during the design phase of the project. At a minimum, filter fences and straw bales will be installed around the construction areas to prevent any sediment from leaving the site. If necessary, in locations of high precipitation or high runoff potential (determined by soil type and slope), sediment ponds will be constructed, and any runoff directed to these. Entrances to each site will be covered by a coarse gravel pad to limit the amount of sediment leaving the site.

Areas that require additional clearing for construction other than directly for the pipeline, including pump stations, block valve locations, and contractor yards, will meet the erosion control and sediment BMPs as set forth in the Stormwater Management Manual. The 13 general requirements for site erosion and sediment control are listed below and will be implemented as necessary.

1. Soil stabilization: Exposed and unworked soils will be stabilized to protect soils from rain and flowing water. This includes such practices as vegetative cover, mulching, or the early application of a gravel base.

2. Site easement: The limits of the construction area will be clearly marked, including the marking of any sensitive areas, buffers, trees and other vegetation to be retained and water courses.

3. Adjacent properties: Adjacent properties will be protected from sediment deposition. This includes providing some type of barrier between the construction zone and adjacent properties which can include a natural vegetative buffer.

4. Timing: One of the first steps of construction will be the construction of sediment control structures such as sediment traps and barriers. When feasible, these features will be in place prior to clearing of the area.

5. Slopes: Cut and fill slopes will be designed and constructed to minimize erosion. Exposed slopes will be stabilized to prevent erosion. Stockpiles of erodible raw materials will be covered and bermed to prevent stormwater from entering stockpiles. If piles are so large that they cannot be feasibly covered and contained, erosion control practices will be implemented at perimeter of site and temporary sediment traps will be used to offsite movement.

6. Down gradient control: Offsite erosion will be controlled. In addition to Item #2 above, measures will be implemented for additional protection of downstream or downgradient properties or watersheds.

7. Conveyance channels: If required, temporary conveyance channels will be designed, constructed and stabilized to prevent erosion from the expected velocity of flow from a 25-year, 24-hour frequency storm.

8. Storm drains: If storm drain outlets are constructed, they will be protected so that stormwater runoff will not enter offsite stormwater systems without first being filtered or otherwise treated to remove sediment.

9. Utilities: If underground utility construction is required, lengths open will be limited to 500' at any

one time; excavated material will be placed on the uphill side of the excavation, and trench dewatering will be directed into a sediment trap.

10. Site access roads: Provisions will be made to minimize the transport of sediment onto paved road surfaces. If sediment is transported onto roads it will be cleaned up at the end of each day.

11. Removal of BMPs: All temporary erosion and sediment control measures will be removed within 30 days after the site's use as a construction staging area has ended and stabilization measures are in place and operating according to performance standards, unless there is a continuing need for the site for another project.

12. Dewatering: In any area that has dewatering devices from exposed surfaces, the discharge will be directed into a sediment trap or some other type of filter system.

13. Pollutant control: All other potential pollutants that occur or are used on site during construction (such as petroleum products) will be handled and disposed of in a manner which does not contaminate stormwater.

Permanent Stabilization

Immediately following construction at each site, the site will be revegetated using native, non-invasive plant species, or hydroseeded (where appropriate) using a grass and forb mixture recommended by the Natural Resources Conservation Service and the Washington Department of Fish and Wildlife. Access areas and areas surrounding control buildings may be graveled, depending on site conditions.

Stormwater Management Considerations

All stormwater will be contained on site and, if necessary, discharged off site at a rate that is no greater than what would have occurred under natural conditions on the site. The containment structure will allow for infiltration and evaporation of the stored water. The detention basin will be sized appropriately to a minimum 25 year event, allowing for losses from infiltration. Discharge offsite will require an NPDES permit. The pump station at Thrasher is the only pump station where this situation is expected to occur.

Maintenance

All erosion and sediment control BMPs will be inspected and maintained prior to and after major storms and on a routine basis. Control structures, if any are required, will be checked immediately following major rain events, any debris removed, and repairs made promptly.

2.10.2.9 Kittitas Terminal

Facility Description

The Kittitas Terminal will be a distribution and storage facility, located just outside the town limits of Kittitas, Washington, in S12, T17N, R19E, Kittitas County. The site occupies 27 acres. The facility will support both pipeline operations and truck loading/unloading operations. Several operations buildings, truck loading/unloading rack, pump station, and a nine storage tank capacity tank farm will be constructed on the site. The proposed site has been used for agricultural crops, but some edge vegetation consists of grasses and forbs. The site is nearly flat, with 0 to 2 percent slopes. Areas adjacent to the proposed facility site are mostly agricultural lands. No water bodies are in close vicinity of the site. The surrounding areas will be protected from any increased runoff and sedimentation through the use of erosion and sediment control BMPs.

A specific erosion and sediment control plan for the construction of the Kittitas Terminal will be prepared. A more detailed plan for the storage facility will be included in the SWPP plan to be submitted to EFSEC no less than 60 days prior to construction.

Erosion and Sediment Control BMPs

BMPs such as those described for construction of the pipeline will be utilized as necessary. Filter fences and straw bales will be installed around the construction areas to prevent any sediment from leaving the site. A retention basin will be constructed on site to retain stormwater runoff. Runoff will then be allowed to evaporate from the basin. Coarse gravel will be placed at the entrance to the construction site to help prevent sediment from leaving the construction area. Any sediment accumulating on paved roads due to construction will be removed daily. Wetting exposed soil may be used if dust becomes a problem. Disturbed areas will be revegetated or hydroseeded as soon as possible to limit erosion.

Permanent Stabilization

Following construction, operational areas will be covered with concrete, asphalt, or graveled. Areas not covered will be revegetated with native, non-invasive plant species or landscaped.

Stormwater Management Considerations

Any stormwater runoff on site will be directed to sediment basin and allowed to evaporate or infiltrate into the ground on site. Therefore, stormwater runoff off site is not expected to increase due to construction.

Maintenance

All erosion and sediment control BMPs will be inspected and maintained prior to and after major storms and on a routine basis. Control structures, if they are required, will be checked immediately following major rain events, any debris removed, and repairs made promptly.

2.10.2.10 Hydrostatic Testing Areas

Upon completion of the hydrostatic testing, the test water will be analyzed for chemical parameters and treated, if necessary, prior to being discharged into temporary sediment traps to allow suspended particles to settle. Water from the sediment traps will be released at a rate to minimize impacts to the receiving water body (See Section 2.7 Characteristics of Aquatic Discharge Systems).

2.10.2.11 Stormwater Good Housekeeping Practices

The following are BMPs for the control of pollutants other than sediment during construction of the pipeline, distribution/storage facility, and pump stations. Pollutants other than sediment include cleared vegetation debris, garbage, sanitary wastes, fertilizer, equipment wash water, welding wastes and residues, hydrostatic test water, and oil, solvents, and other chemicals from equipment maintenance.

Good housekeeping practices (as previously discussed in Section 2.10.2.2) will be kept at all construction sites. Garbage will be kept in appropriate collection vessels and disposed of according to applicable regulations. Sanitary facilities will be well maintained and conveniently located.

Chemical and Hazardous Materials Storage and Use

Appropriate storage areas for liquid chemicals (including pesticides and fertilizers), waste oils, solvents, or petroleum products will be maintained in designated locations at least 100' away from all water bodies and drainage ways. The storage areas will be placed on concrete or asphalt pads (impermeable) and will include secondary containment in the event of a leak or spill. The secondary containment will be sized such that all potentially leaked stored materials will be collected.

Chemicals will be properly labeled and tight-fitting lids will be maintained on all containers. Containers will be raised off the ground on pallets or the storage area will be bermed to prevent stormwater from contacting the containers. Storage areas will be covered where feasible. Drip pans or equivalent adsorbent materials will be placed at potential drip/spill locations during filling or unloading of containers and containers will be checked daily for leaks and spills. Any containers that are deteriorating will be immediately replaced. Spill cleanup materials will be stored and maintained on site in case of accidental release and employees will be trained in spill control procedures.

Fertilizers generally will not be applied to areas immediately adjacent to water bodies or drainage pathways. If fertilizer is necessary near water bodies, fertilizer with little or no phosphorous will be selected if available. Local authorities will be consulted before applying fertilizer near any sensitive water body.

Vehicle Maintenance and Petroleum

To prevent petroleum products from contaminating soils and water bodies, the following BMPs will be implemented. Construction equipment and vehicles will be properly maintained to prevent leaking of petroleum products. Specific staging areas for equipment and vehicle maintenance will be established away from water bodies and drainage pathways. Drip pans and tarps or other containment system will be used when changing oil and other vehicle and equipment liquids. Any contaminated soils or materials will be disposed of off-site in proper receptacles or at an approved disposal facility. Vehicle and equipment fueling will be attended at all times by site personnel. Spill cleanup materials will be stored on site and employees will be trained in spill control procedures.

Wash water (including mild detergents) from the body of vehicles may be allowed to infiltrate into a permeable area such as gravels grass or loose soil. Vehicle engine or under-body and equipment wash water will be disposed of off-site at appropriate facilities depending on the contents of the waste water. Waste water will not be discharged directly into water bodies.

Petroleum products and other maintenance chemicals will be properly stored in appropriately labeled containers under sheltered areas. The storage shelters will be designed with an impermeable floor area. Materials for cleaning up spills will be kept on site. Spills will be cleaned up immediately in accordance with the Spill Prevention and Control Plan (see Section 2.9 Spill Prevention and Control).

Solid Wastes

Solid wastes, such as vegetation removed during clearing, sanitary waste, food and food container waste, and metal and wood scraps, will be collected in an appropriate collection vessel and disposed of according to applicable regulations or recycled/reused. Sanitary facilities will be well maintained and conveniently located. Waste containers will be labeled and located in a sheltered area away from water bodies and drainage pathways. Erosion and sediment control structures will be frequently inspected for accumulations of solid waste and any waste removed immediately.

2.10.3 STORMWATER MANAGEMENT AND POLLUTION PREVENTION DURING OPERATION

Operational BMPs for the proposed project consist of company policies, operating and maintenance procedures, personnel training, good housekeeping, prohibition of undesirable practices, and other administrative practices to prevent or reduce pollution of waters of the state. Source control BMPs are physical, structural, or mechanical devices or structures that are intended to prevent pollutants from entering stormwater.

At this time the plans do not call for installing water and sewage facilities at the pump stations. Demand for these facilities will be minimal since the stations will be unmanned and visited only periodically for maintenance or troubleshooting.

Storm water will not be discharged from any pump station site without being monitored for contamination. After it has been determined that the accumulated water is uncontaminated it will be released. If a sheen is found on the water when monitored a vacuum truck will be utilized to haul the water away.

2.10.3.1 Kittitas Terminal

Following construction, operational areas will be covered with concrete, asphalt, or graveled. Areas not covered will be revegetated with native, non-invasive plant species or landscaped. Generally the slope of the terminal will be designed to retain all water on site or provide drainage to a large, shallow vegetated retention basin. The stormwater retention basin will be designed to contain any precipitation or runoff at the facility, and to collect runoff from the 100-year, 24-hour storm. The size and location of the basin will be determined during the design phase of the project (see Figure 2.3-7).

2.10.3.2 Stormwater Pollution Prevention - Operation

Operational BMPs will be adopted to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as needed to prevent stormwater pollution. Examples of good housekeeping practices which will be employed by Olympic Pipe Line (OPL) will include:

- Regular inspection of stormwater control facilities (retention basin, oil/water separators, etc.).
- Neat and orderly storage of chemicals.
- Prompt cleanup and removal of spills.

At least annually, facility operators will also receive training in any stormwater control measures and related spill control laws and regulations. Specific features of the terminal and pipeline which are intended to prevent excessive stormwater releases or releases of oil and petroleum products will be reviewed. These employees will also receive spill response training as described in the Spill Prevention and Control Plan (see Section 2.9 Spill Prevention and Control). Employees will be trained in the following spill response measures:

- Identifying areas that may be affected by a spill and potential drainage routes.
- Reporting of spills to appropriate individuals.
- Employing appropriate material handling and storage procedures.
- Implementing spill response procedures.

Source control BMPs will be employed for chemical storage areas, loading and unloading areas for liquid materials, above ground storage tank systems, container storage facilities, outside storage areas, and outside maintenance areas. Source control BMPs will include the following:

- Appropriate storage areas for liquid chemicals (including pesticides and fertilizers), waste oils, solvents or petroleum products will be maintained in designated locations away from all water bodies and drainage ways.
- Chemicals will be properly labeled and tight fitting lids will be maintained on all containers.
- Containers will be raised off the ground on pallets or the storage area will be bermed to prevent stormwater from contacting the containers. Storage areas will be covered where feasible.
- Drip pans or equivalent adsorbent materials will be placed at potential drip/spill locations during filling or unloading of containers and containers will be checked daily for leaks and spills. Any containers that are deteriorating will be immediately replaced.
- Spill cleanup materials will be stored and maintained on site in case of accidental release and employees will be trained in spill control procedures.

Stormwater runoff from vehicle and equipment cleaning, maintenance and fueling areas may contain hydrocarbons, oils and greases, and heavy metals. Hence, source control BMPs will also be employed in the design of fueling stations, vehicle and equipment washing and steam cleaning areas. and outside maintenance areas. Source control BMPs will include the following:

- Wash water (including mild detergents) from the body of vehicles may be allowed to infiltrate into a permeable area such as gravels grass or loose soil.
- A tarp, ground cloth, or drip pans will be used beneath vehicles or equipment during maintenance activities to capture drips or spills. Collected material will be disposed of

properly.

- C All fluids collected during onsite vehicle and equipment maintenance will be packaged for off-site disposal or recycling at an acceptable facility.
- C Vehicle and equipment fueling will be attended at all times by site personnel.
- C Runoff from maintenance and fueling areas will be piped directly to the oil/water separator.
- C Spill cleanup materials will be stored on site and employees will be trained in spill control procedures.

Where required, at chemical or fuel unloading sites, secondary spill containment paving will be provided for environmental protection. Hazardous substances collected within these containments will be isolated for proper cleanup and disposal according to local, state, and federal regulations. Stormwater collected within hazardous material secondary containments will be retained by normally closed valved outlets. This stormwater will be allowed to evaporate. Storm water from other areas on the terminal routed into the retention basin and allowed to evaporate. The area around the truck rack will drain to an oil/water separator and discharge to the retention basin.

In conjunction with the stormwater controls employed in construction design, additional permanent erosion and sediment control will be accomplished through appropriate site landscaping, grass, or native vegetative cover.

The stormwater catch basin and detention system will be inspected at least annually as part of the site preventive maintenance program. Stormwater catch basins will be cleaned if the collected deposits fill more than one-third of the depth from the basin to the invert of the lowest pipe leading into or out of the basin.

During periods of heavy rainfall, secondary containment structures will be inspected for accumulations of water. The presence of oil contamination in any accumulated rainwater will be determined by examining the surface of the water for a sheen. If an oil sheen is not observed, accumulated rainwater will be allowed to evaporate. Otherwise, accumulated rainwater will be drained and routed through the oil/water separator until the oil layer nears the intake; the remaining oil/water mixture will either be cleaned using absorbent, pumped directly into drums for disposal, or routed through the oil/water separator. After draining of the containment, the drain valve will be closed to prevent inadvertent drainage.

2.10.3.3 LONG-TERM MONITORING

A five-year monitoring plan for revegetation, including contingency plans, will be developed and implemented. Parameters to be monitored will include the success of replanted vegetation, invasive species, and damage to remaining vegetation along the corridor, such as blowdown or erosion of topsoil. Additional erosion and sediment control and revegetation will be provided as necessary.

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